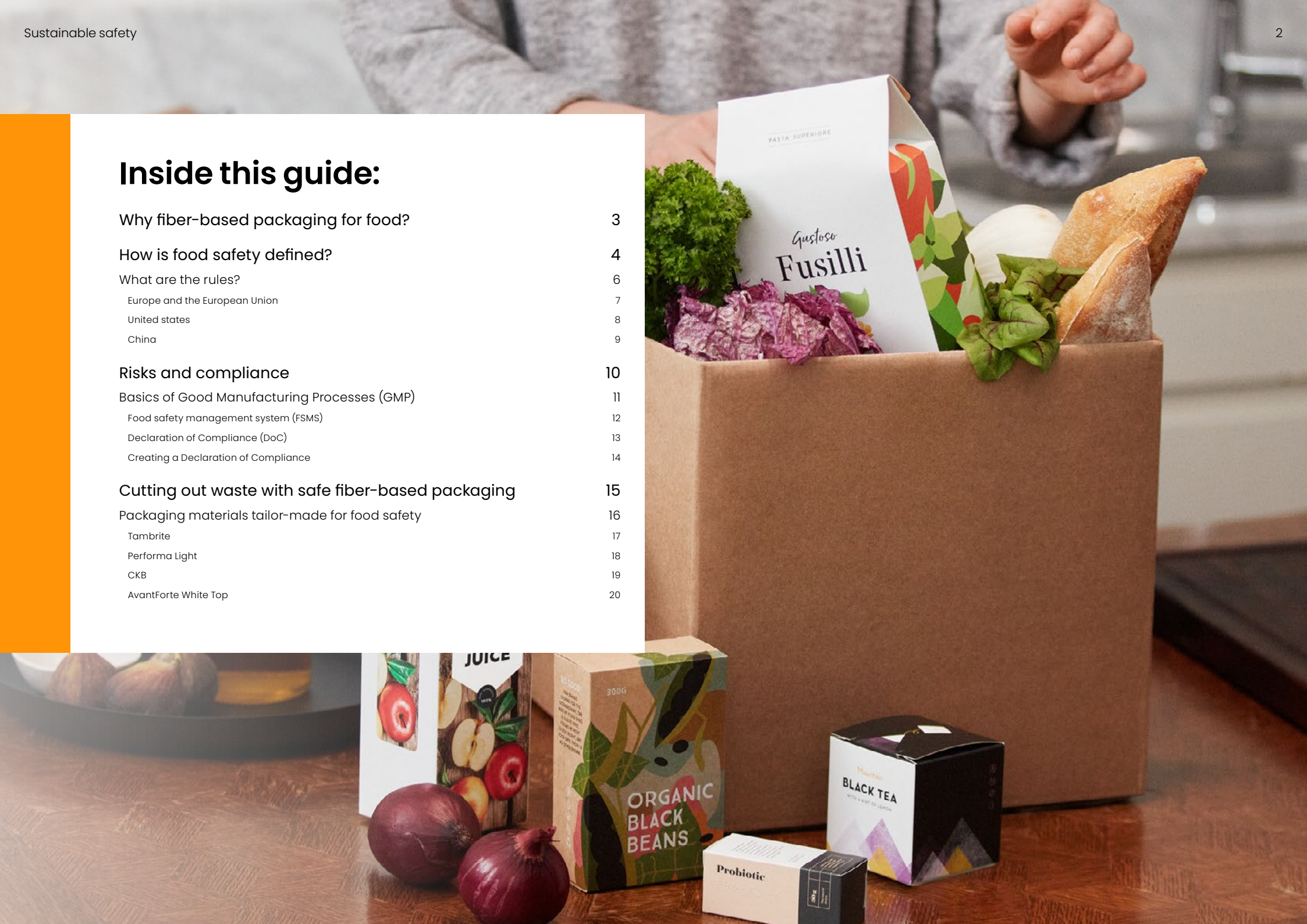
Sustainable safety:

How food-safe paperboard packaging protects consumers and reduces food waste

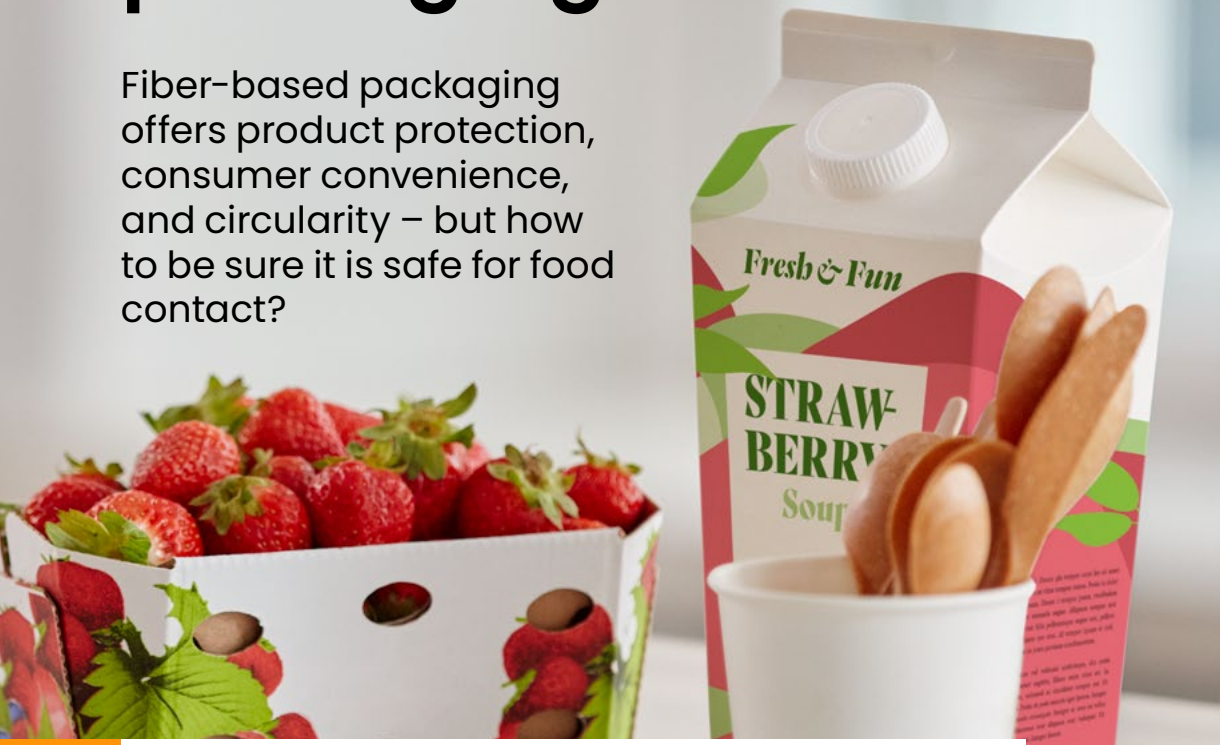
StoraEnso

Inside this guide:



Why fiber-based packaging for food?

Fiber-based packaging offers product protection, consumer convenience, and circularity – but how to be sure it is safe for food contact?



We also cover packaging circularity and functionality in other downloadable guidebooks:

- A practical guide to a renewable, fiber-based food packaging future
- The circular journey of wood fibers
- Barrier coatings: the hero of demanding packaging applications

Hygienic paperboard is the foundation for ensuring food packaging safety. Upholding food safety is vital for serving consumers and ensuring that food arrives to their homes as it was intended.

Fiber-based materials offer versatile, circular solutions to meet packaging challenges -- both today and in the future. Brand owners, retailers, and converters can benefit from features like product protection, reduced carbon footprint, and improved recyclability. When designed with food safety in mind, these features are complementary to safeguarding consumer health and well-being.

Stora Enso's materials are traceable and safe for their intended applications. Through careful selection of raw materials and food safety and compliance testing, we ensure that our products do not endanger human health when properly used. When we deliver our materials, packagers can trust that consumers are able to enjoy their food safely. Importantly, we take measures to communicate essential information about our products' safe use and chemical purity to the value chain.

At Stora Enso, food packaging safety begins with our promise:

> "We play fair and choose our business partners accordingly. We deal only with reliable partners upstream and downstream to avoid intentional actions by businesses or individuals to gain improper advantage."

We also hold packaging sustainability in equally high importance, and one does not have to be sacrificed for the other. In fact, safe and clean materials support packaging sustainability by helping to reduce food waste.

> **In this guidebook, we share our view on food safety, explain how safety is upheld at our own sites and throughout the value chain, and demonstrate how we ensure compliance and accountability.**

How is food safety defined?

Food packaging safety covers selection of raw materials, manufacturing of packaging materials, packaging production, and package filling. With fiber-based materials like paperboard, **food safety means that the material is safe for the intended purpose, poses no danger to human health when properly used[1], and will not change or taint the packaged content.**

1. When manufacturing packaging from the material, each part of the converting chain must take care to ensure suitability for the intended end-use.

At our sites, food safety begins with understanding the intended end-use, such as dairy products or fresh produce with a peelable outer layer. Expert partners, like Stora Enso, will learn the customer's needs in terms of the type of food, shelf life, temperature, and purity requirements, and can help packagers find packaging solutions that provide the requisite safety without using excess materials. For example, fresh or recycled and bleached or unbleached fibers. It's also important to keep in mind that every operator in food value chain has their own responsibility to uphold safety and use materials according to their recommended applications.

Safeguarding human health is the primary driver for ensuring food safety, but several other influencing factors include:

- Legislation and national administrations
- Packaging customers
- Research
- Media and public concern
- NGOs

Additional influences include transportation and storage times, extended packaging roles like heating, new and advanced processing technology, multimaterials, and circular economy. It can also be impacted by innovations and new packaging end-uses.

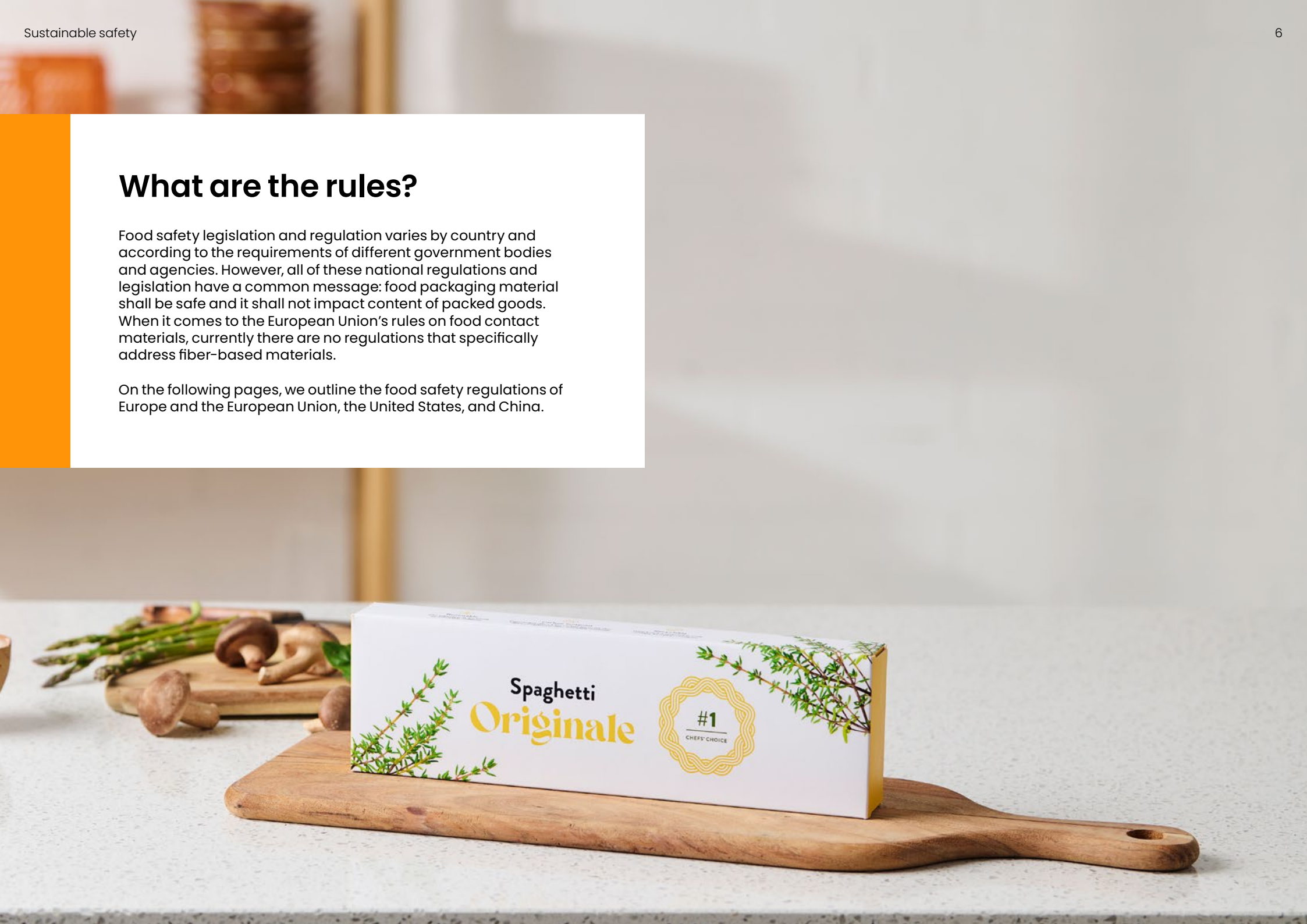
Barrier coatings also play a role in securing food safety by creating sealability, protection against possible food contamination and preventing air from entering or escaping the package.

To learn more about how barrier coatings protect food and uphold safety, download our guidebook **here**.

What are the rules?

Food safety legislation and regulation varies by country and according to the requirements of different government bodies and agencies. However, all of these national regulations and legislation have a common message: food packaging material shall be safe and it shall not impact content of packed goods. When it comes to the European Union's rules on food contact materials, currently there are no regulations that specifically address fiber-based materials.

On the following pages, we outline the food safety regulations of Europe and the European Union, the United States, and China.

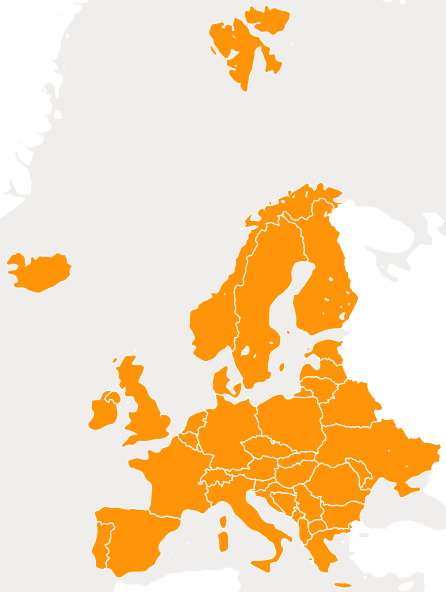


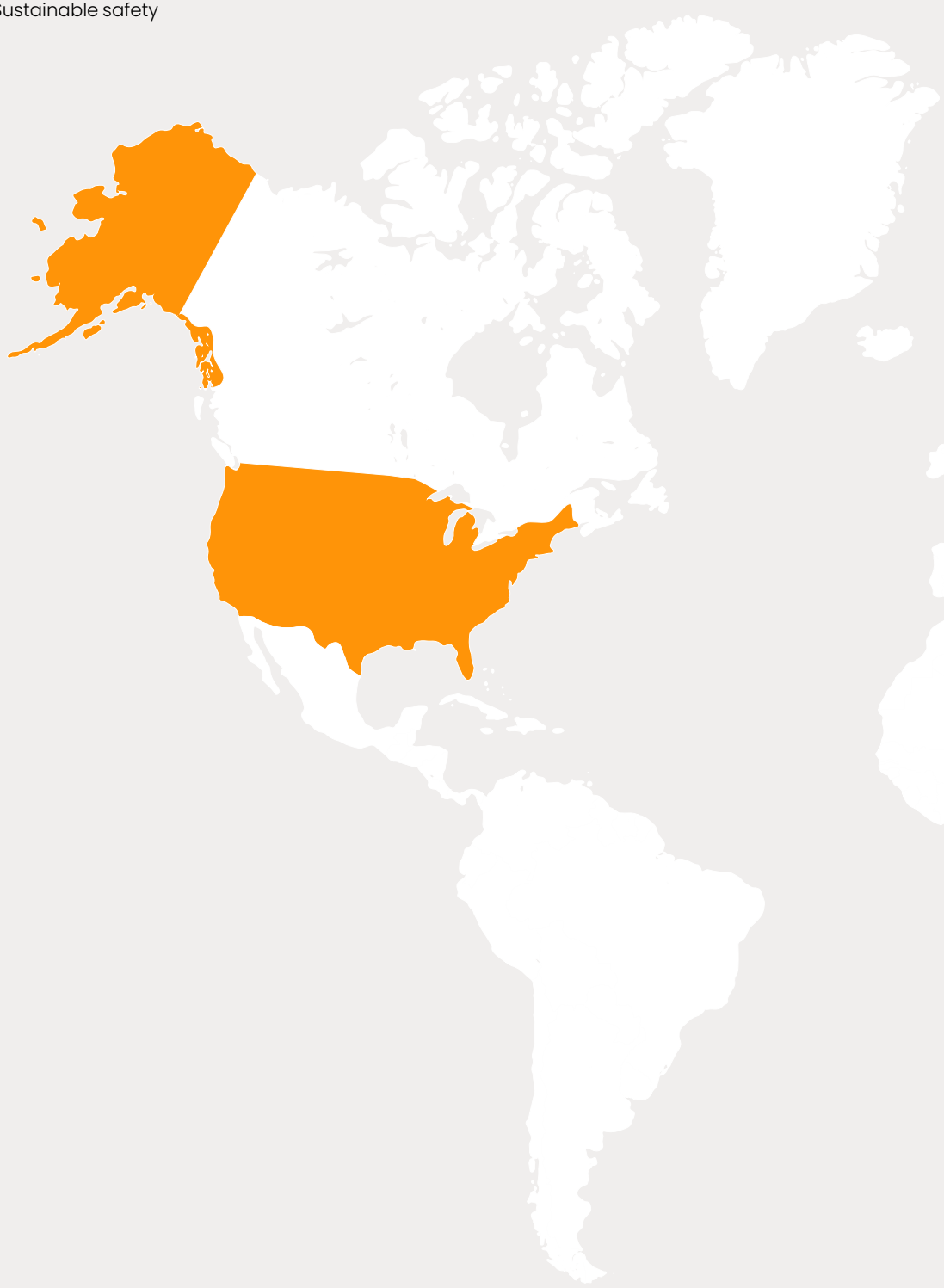
Europe and the European Union

In the European Union, the General Food Law Regulation outlines general safety principles, requirements, and procedures, and established the European Food Safety Authority (EFSA) to provide scientific advice. The European Commission has also implemented a range of policies addressing aspects of food safety including labeling and nutrition, chemical safety, animal welfare, and food waste.

EU Commission Framework Regulation 1935/2004 addresses materials that contact food products, whether directly or indirectly. Within this regulation, Article 3 establishes rules for materials to be safe in their intended end-uses, and this can mean, for example, preventing possibly harmful chemicals or substances within the packaging material from migrating to the packaged product. This is to prevent both possible hazards to human health and changes to the food, whether through taste, appearance, or otherwise.

Certain European countries maintain additional rules for food contact packaging, such as the German Federal Institute for Risk Assessment's (BfR) Recommendation XXXVI specifically concerning paper and board. While not a legally binding document, the BfR Recommendation addresses acceptable chemicals and their acceptable limits when used in fiber-based material, as well as preconditions for using recycled fibers in these applications.On the following pages, we outline the food safety regulations of Europe and the European Union, the United States, and China.





United States

Two agencies are primarily responsible for regulating food safety in the United States: the US Department of Agriculture (USDA), which regulates meat, poultry, and eggs, and the Food and Drug Administration (FDA) that regulates all other food and food ingredients. The FDA also regulates packaging that contacts food and determines labelling requirements.

The Code of Federal Regulations (CFR) Title 21 is the comprehensive set of food and drug rules for the US, a section of which (Chapter I) focuses exclusively on food products and addresses packaging requirements. This includes a list of substances recognized as safe for food contact and those that are prohibited.

China

Food safety guidelines concerning packaging and packaging materials are recorded in GB 9685-2016 National Food Safety Standard for the Uses of Additives in Food Contact Materials and Products. The standard includes a list of additives that are permitted for use in food contact materials, and defines limits and restrictions. An appendix of the standard specifically addresses permitted additives for paper and board for food contact use.

Risks and compliance

For packaging producers, potential risks to food safety include contaminants that can migrate to the packed content or food product, both from the packaging material and from external sources. Packaging producers avoid possible food safety risks by using only safe and approved raw materials, and by implementing and adhering to Good Manufacturing Processes (GMP). Different industries maintain their own respective GMPs, and in the food packaging sector, a common example of GMP is food safety management systems (FSMS).

Basics of Good Manufacturing Processes (GMP)

According to CEPI[2], the Confederation of European Paper Industries, GMP refers to quality assurance measures that ensure materials are produced and controlled consistently to meet relevant rules and standards to safeguard human health and prevent changes to the composition of food.

Process definitions and scope

Understanding customer needs and expectations, including the intended end-use and regulatory requirements. Defining processes that can influence food and product safety, including internal processes and outsourced processes both on- and off-site.

Risk management with control measures

Prevents and reduces food safety hazards. Control plans include lists of hazards, monitoring standards, corrective actions, and recordkeeping.

Identifying hazards and risks

Highlights potential hazards and assesses risk in processes, including biological, chemical, and physical types.

Food and safety management personnel

Experts appointed to oversee and manage all areas critical to food and product safety. Responsibilities include reviews of risk assessments and control plans, regular audits (internal and external), reviews of supplier compliance, and training.

Certifications

GMP management systems can comply with food safety management standards like FSSC 22000. Certain GMP systems can be endorsed by bodies such as the Global Food Safety Initiative (GFSI).

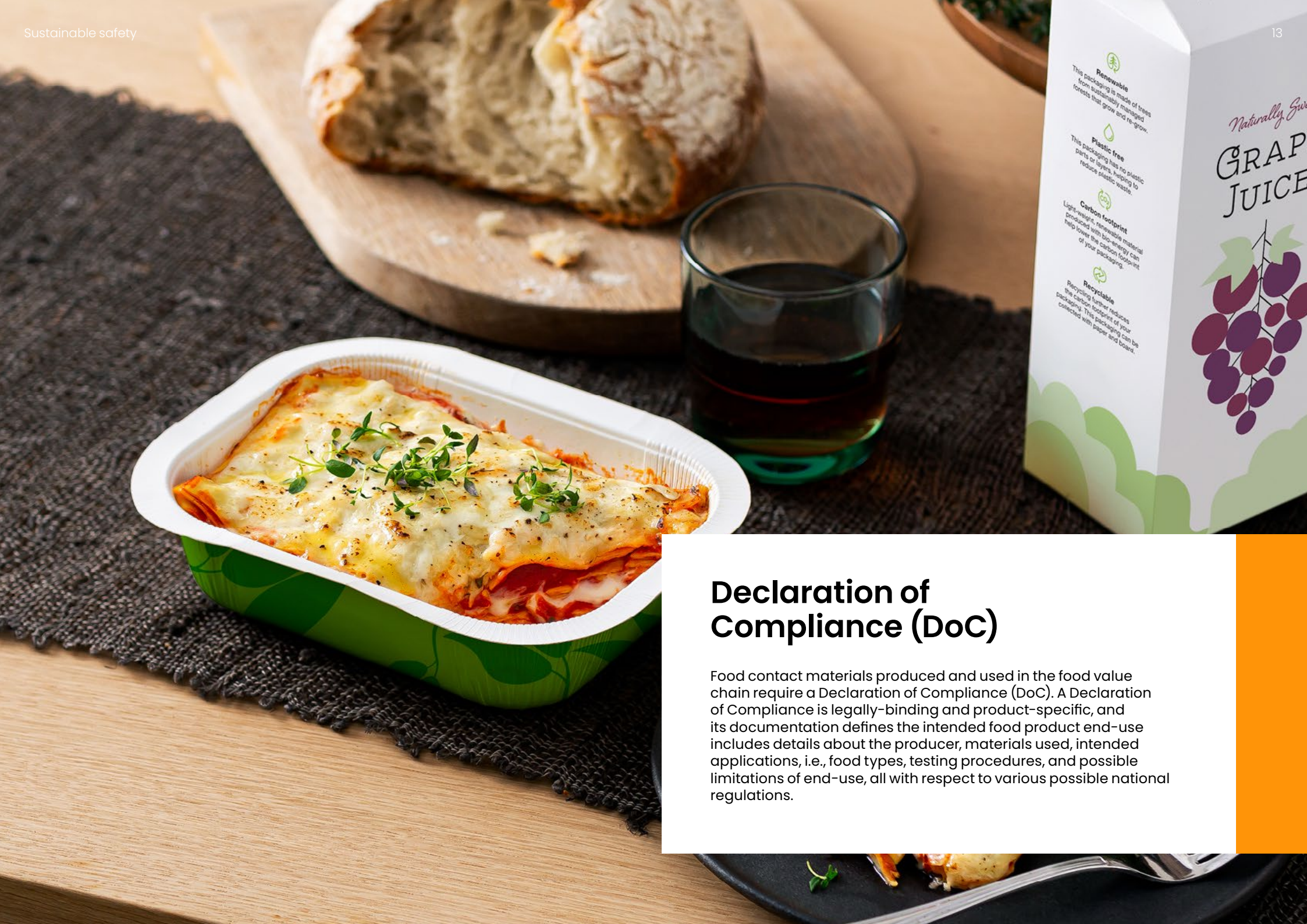
2. GMP "means those aspects of quality assurance which ensure that materials and articles are consistently produced and controlled to ensure conformity with the rules applicable to them and with the quality standards appropriate for their intended use by not endangering human health or causing an unacceptable changed in the composition of the food or causing a deterioration in the organoleptic characteristics thereof."

Food safety management system (FSMS)

For companies belonging to a food value chain, implementing a food safety management system (FSMS) helps secure food safety and prevent hazards that can potentially impact food safety. These systems can be certified by schemes such as ISO 22000 or FSSC 22000.

ISO 22000 is a voluntary international standard for FSMS that lays out actions for food supply chain organizations regardless of size – whether producer, packager, or retailer - to improve and optimize food safety performance. To achieve ISO 22000 certification, organizations need to implement a FSMS and take measures to ensure a clean operating environment and hazard mitigation, along with others like those described earlier in GMP.

FSSC 22000 is a certification scheme that incorporates ISO 22000, yet establishes additional requirements. These include labeling and reducing food fraud, and in some cases, requirements concerning allergens and environmental monitoring.



Declaration of Compliance (DoC)

Food contact materials produced and used in the food value chain require a Declaration of Compliance (DoC). A Declaration of Compliance is legally-binding and product-specific, and its documentation defines the intended food product end-use includes details about the producer, materials used, intended applications, i.e., food types, testing procedures, and possible limitations of end-use, all with respect to various possible national regulations.

Creating a Declaration of Compliance

At Stora Enso, we create a DoC for each food contact material product we develop and manufacture. Below are our four steps to creating a DoC.

Step 1

Define the end-use and choose material's ingredients according to intended end-use

- Specify food contact applications. This includes factors such as food type, e.g., dry, moist, liquid, fatty, or acidic, and conditions for use, e.g, storage temperature, contact time, and oven or microwave heating.
- Consider possible limitations.

Step 2

Review legislation and compliance

- Consult Relevant food contact legislation.
- Define compliance tests and conditions.

Step 3

Testing according to material and end-use

- The material can be tested for properties that depend on intended end-uses.

Step 4

Publish DoC

- Include relevant information including the product name and fiber source, i.e., fresh or recycled fiber and percentages, regulation compliance, some test results, suitable end-uses.
- Sign by safety expert.
- Share the DoC with direct customers.

Cutting out waste with safe fiber-based packaging

No matter the material or design, safety is priority when packaging food products. Safety wins consumer trust, and it goes a long way in enhancing packaging sustainability through minimizing food waste. Smartly designed packaging can also reduce waste in other aspects, too.

Fiber-based food packaging is circular and can be collected with other fiber-based materials and recycled into new packages. Compostable solutions, including barrier-coated materials, can be collected with biowaste – an important feature when packaging contains food residue or access to recycling is not present. Today, fiber-based material is lighter and stronger, meaning less material is needed to achieve necessary strength and durability. On top of this, it features a printable surface to communicate important safety information, among other valuable details.

Want to learn more about Stora Enso's safe and sustainable materials for packaging food products?

Click **here** to find your application and discover more.

Packaging materials tailor-made for food safety

Tambrite

A prime choice for high-quality carton board that prioritizes food safety. With an ideal stiffness-to-weight ratio, it's stronger and lighter than ever. This means you can get more packaging out of the same amount of raw material.

Tambrite is well-suited for a range of applications including:

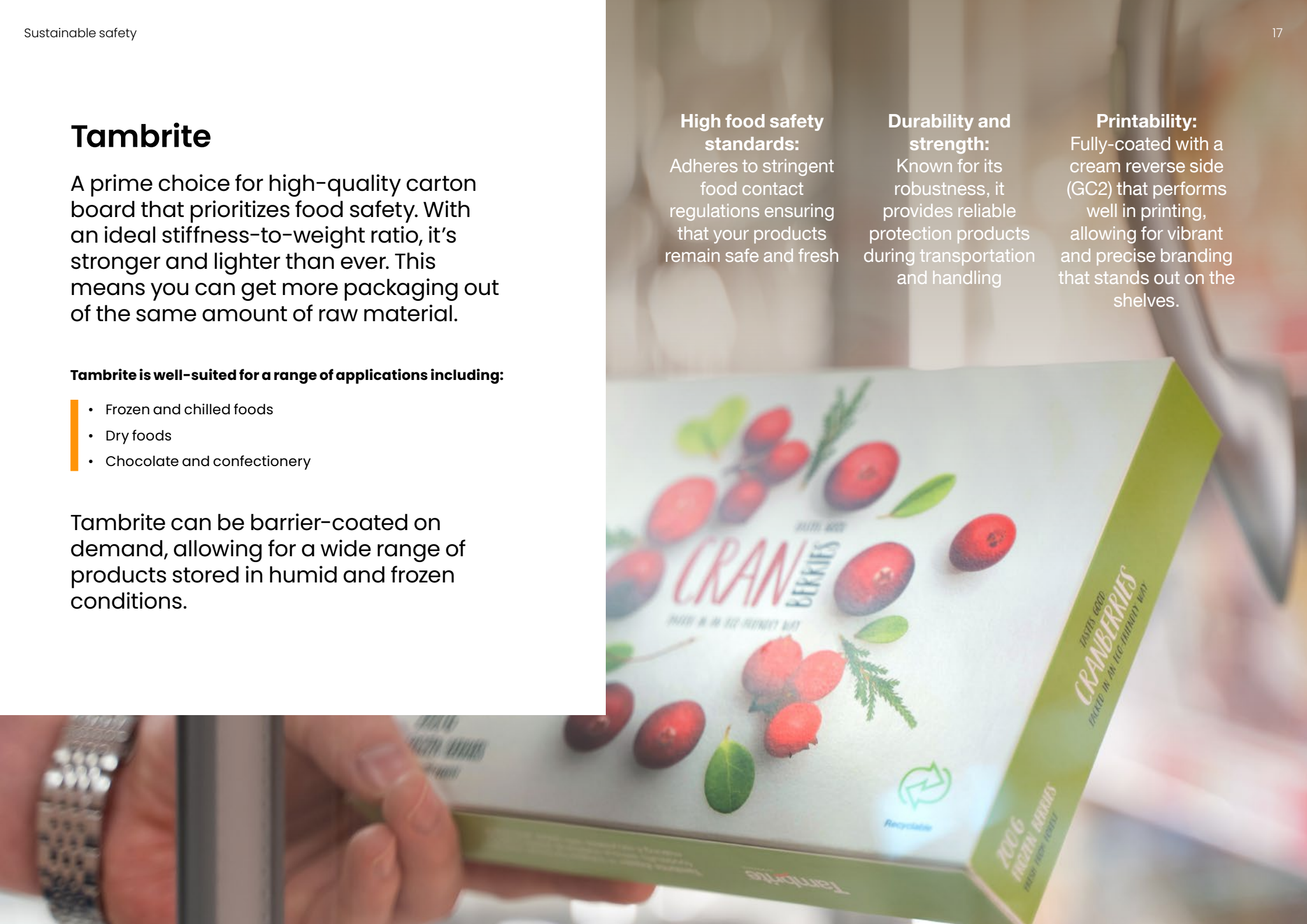
- Frozen and chilled foods
- Dry foods
- Chocolate and confectionery

Tambrite can be barrier-coated on demand, allowing for a wide range of products stored in humid and frozen conditions.

High food safety standards: Adheres to stringent food contact regulations ensuring that your products remain safe and fresh

Durability and strength: Known for its robustness, it provides reliable protection products during transportation and handling

Printability: Fully-coated with a cream reverse side (GC2) that performs well in printing, allowing for vibrant and precise branding that stands out on the shelves.



Performa Light

Performa Light folding box board is tailor-made for food.

Ideal product end-uses for Performa Light include:

- Frozen and chilled food
- Dry food
- Chocolate and confectionary
- Food plates and containers
- Beverages and multipacksapplications

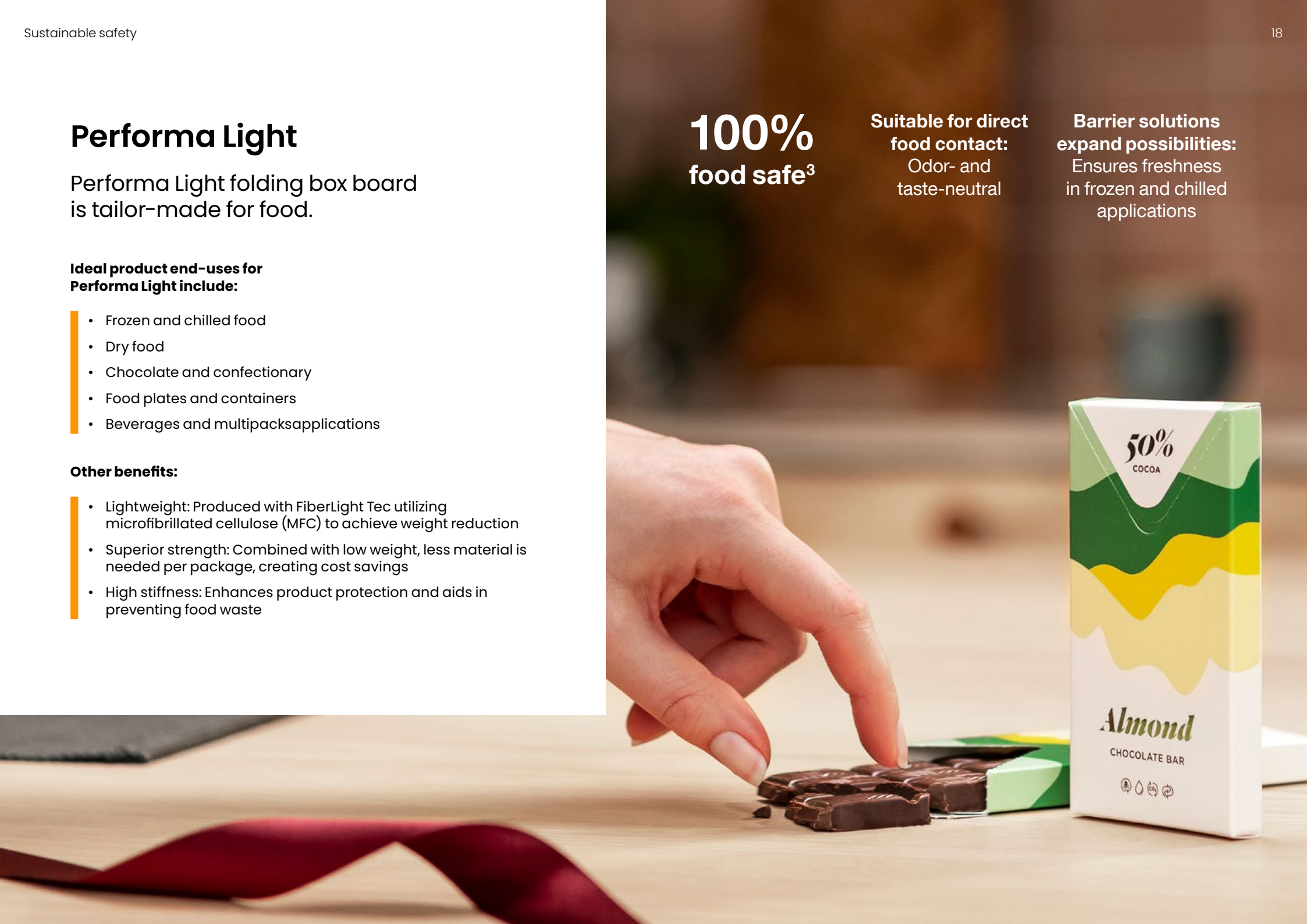
Other benefits:

- Lightweight: Produced with FiberLight Tec utilizing microfibrillated cellulose (MFC) to achieve weight reduction
- Superior strength: Combined with low weight, less material is needed per package, creating cost savings
- High stiffness: Enhances product protection and aids in preventing food waste

100%
food safe[3]

Suitable for direct food contact:
Odor- and taste-neutral

Barrier solutions expand possibilities:
Ensures freshness in frozen and chilled applications



CKB

A versatile coated unbleached kraft (CUK) solution designed with stringent food safety standards and exceptional printing properties, offering strength and standout shelf presence.

Ideal product end-uses for CKB include:

- Dry, frozen, and chilled food
- Wines and spirits
- Beer multipacks and beverage carrier packs
- Chocolate and confectionery

Available product grades:

- **CKB:** Features a smooth white surface and an unbleached inside. Excellent printability, convertibility and material efficiency.
- **CKB Nude:** An all-brown board with a distinctly natural look and feel. Perfect for packaging that promotes an artisanal appeal.
- **CKB Carrier:** A strong kraft back board specially developed to replace plastics in carrier multipacks.

Renewable and food-safe:
100% fresh fibers from responsibly-managed Nordic forests.

Versatility
Achieve a variety of packaging designs for a wide range of applications.

Strong and dependable
Exceptional strength from an efficient, lightweight material.

AvantForte White Top

Fresh fiber-based kraftliner with superior dependability naturally suited for food products. A recyclable and renewable choice for sensitive end-uses.

The AvantForte White Top difference is thanks to its Tri-PlyTM technology featuring 100% fresh fibers. The innovative 3-layer structure withstands natural elements and other tough conditions.

Ideal product end-uses for AvantForte White Top include:

- Fresh fruits
- Fresh vegetables

Excellent printability
Evenly smooth and bright surface for premium printing.

Advanced food safety
Naturally white and OBA-free without any excess chemicals.

Strength from Nordic nature
Durable and light with less material needed per package.

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